

## REGIONAL COMPETITION - ROUND 1

### TOSS-UP

1. ASTR; Multiple Choice: Approximately how many Earth days are there in the Mercurian year?
- a) 111 days
  - b) 88 days
  - c) 50 days
  - d) 25 days

ANSWER: B -- 88 DAYS

### BONUS

1. ASTR; Short Answer: The largest known asteroid is named:

ANSWER: CERES

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### TOSS-UP

2. BIOL; Multiple Choice: The adult human of average age and size has approximately how many quarts of blood?
- a) 4
  - b) 6
  - c) 8
  - d) 10

ANSWER: B -- 6

### BONUS

2. BIOL; Multiple Choice: Once erythrocytes (pron: uh-rith'-eh-sites) enter the blood in humans, it is estimated that they have an average lifetime of how many days?
- a) 10 days
  - b) 50 days
  - c) 120 days
  - d) 200 days

ANSWER: C -- 120 DAYS

### TOSS-UP

3. PHYS; Multiple Choice: Ball "A" ROLLS down an inclined plane without slipping. An identical ball, Ball "B", SLIDES down the same inclined plane without rolling. Which of the following statements is true?
- a) Ball "A" has more kinetic energy
  - b) Ball "B" has more kinetic energy
  - c) their rotational kinetic energies are equal half way down
  - d) their kinetic energies are the same

ANSWER: D -- THEIR KINETIC ENERGIES ARE THE SAME

### BONUS

3. PHYS; Multiple Choice: What is the wavelength in millimeters of a sound wave whose frequency is 35 KILOHERTZ? Assume the speed of sound is 350 METERS PER SECOND.
- a) 100 millimeters
  - b) 1,000 millimeters
  - c) 10 millimeters
  - d) 1 millimeter

ANSWER: C -- 10 MILLIMETERS

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### TOSS-UP

4. CHEM; Multiple Choice: A substance that accepts an electron pair is classified as a:
- a) Bronsted-Lowry acid
  - b) Bronsted-Lowry base
  - c) Lewis acid
  - d) Lewis base

ANSWER: C -- LEWIS ACID

### BONUS

4. CHEM; Multiple Choice: Absorption into the nucleus of an electron from the K shell is called "electron capture". When this happens to Ar-37 (read: A-R-37), the product is:
- a) Cl-37(read: C-L-37)
  - b) Cl-38(read: C-L-38)
  - c) K-37
  - a) K-38

ANSWER: A -- Cl-37

TOSS-UP

5. GENR; Short Answer: What drug, used for treatment of cardiac diseases, is obtained from the purple foxglove?

ANSWER: DIGITALIS

BONUS

5. GENR; Short Answer: What weather phenomenon causes more deaths in the U.S. annually than any other except lightning?

ANSWER: TORNADOES

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TOSS-UP

6. COMP; Short Answer: How many nibbles are in a byte?

ANSWER: TWO

BONUS

6. COMP; Multiple Choice: A COBOL source program has 4 divisions. Which of the following divisions contains the equipment configuration?

- a) Identification
- b) Environment
- c) Data
- d) Procedure

ANSWER: B -- ENVIRONMENT

TOSS-UP

7. CHEM; Short Answer: The first plastic was a mixture of cellulose nitrate and camphor invented in the 1860's by John Hyatt. What was the trademark given to this material?

ANSWER: CELLULOID

BONUS

7. CHEM; Short Answer: What is the chemical composition of quartz?

ANSWER:  $\text{SiO}_2$  or SILICON DIOXIDE

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TOSS-UP

8. BIOL; Multiple Choice: Surplus red blood cells, needed to meet an emergency, are MAINLY stored in what organ of the human body?

- a) pancreas
- b) spleen
- c) liver
- d) kidneys

ANSWER: B -- SPLEEN

BONUS

8. BIOL; Multiple Choice: When a human donor gives a pint of blood, it usually requires how many weeks for the body RESERVE of red corpuscles to be replaced?

- a) 1 week
- b) 3 weeks
- c) 7 weeks
- d) 21 weeks

ANSWER: C -- 7 WEEKS

TOSS-UP

9. PHYS; Multiple Choice: The energy of molecular motion in a gas appears in the form of:
- a) friction
  - b) internal energy
  - c) temperature
  - d) potential energy

ANSWER: C -- TEMPERATURE

BONUS

9. PHYS; Multiple Choice: It has been said that the universe will die an "entropy death". This means that:
- a) the universe will eventually explode.
  - b) the universe will be at the same temperature everywhere.
  - c) the universe will collapse into a black hole.
  - d) matter and antimatter will never combine.

ANSWER: B -- THE UNIVERSE WILL BE AT THE SAME TEMPERATURE EVERYWHERE.

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TOSS-UP

10. ERSC; Multiple Choice: Iceland has a great deal of volcanic activity. The reason for this is:
- a) it was formed above a mid-ocean rift.
  - b) it is part of the "Ring of Fire".
  - c) two tectonic plates are rubbing against each other under Iceland.
  - d) the American plate is diving under the European plate in this region

ANSWER: A -- IT WAS FORMED ABOVE A MID-OCEAN RIFT.

BONUS

10. ERSC; Multiple Choice: Of the following, the rock that is most resistant to both chemical and mechanical weathering is:
- a) shale
  - b) limestone
  - c) marble
  - d) quartzite

ANSWER: D -- QUARTZITE

TOSS-UP

11. BIOL; Short Answer: There are three substances found in animal blood which carry oxygen and which begin with the letter "H". Name any two of these substances.

ANSWER: HEMOGLOBIN, HEMOCYANIN, HEMERYTHRIN

BONUS

11. BIOL; Multiple Choice: The condition in which there is a DECREASE in the number of white blood cells in humans is known as:

- a) leukocytosis (pron: lew-ko-sigh-toe'-sis)
- b) leukopenia (pron: lew-ko-pea'-nee-ah)
- c) leukemia (pron: lew-kee'-me-ah)
- d) leukohyperia (pron: lew-ko-high-per'-e-ah)

ANSWER: B -- LEUKOPENIA

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TOSS-UP

12. PHYS; Short Answer: What is the type of radiative scattering commonly associated with the atmosphere and the reason the sky is blue called?

ANSWER: RAYLEIGH SCATTERING

BONUS

12. PHYS; Short Answer: State the unit of magnetic field strength.

ANSWER: TESLA (ACCEPT GAUSS)

TOSS-UP

13. CHEM; Short Answer: What are alkenes having two double bonds separated by one single bond known as?

ANSWER: CONJUGATED DIENES (PRON: DIE'-EENS)

BONUS

13. CHEM; Multiple Choice: The lunar soil consists primarily of:

- a)  $\text{FeTiO}_2$  (read: F-e-T-i-O-two)
- b)  $\text{Al}_2\text{O}_3$  (read: A-ell-two-O-three)
- c)  $\text{SiO}_2$  (read: S-i-O-two)
- d)  $\text{CuSO}_4$  (read: C-u-S-O-four)

ANSWER: A --  $\text{FeTiO}_2$

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TOSS-UP

14. MATH; Short Answer: The relationship between y and x is given by the equation:  $y = x^2 - 2x + 8$ . For what value of x is y a minimum?

ANSWER: 1

BONUS

14. MATH; Short Answer: A straight line is plotted on an XY coordinate axis. The line intercepts the y axis at 3 and makes an angle of 45 degrees with respect to the x axis. Give the equation for this line.

ANSWER:  $Y = X + 3$  OR  $Y = -X + 3$  OR  $X + Y = 3$  OR  $Y - X = 3$

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TOSS-UP

15. GENR; Short Answer: To what familiar fruit is the plantain similar?

ANSWER: BANANA

BONUS

15. GENR; Multiple Choice: Pollination by birds is called:

- a) autogamy
- b) ornithophily (pron: or-nith-o'-philly)
- c) entomophily (pron: ent-eh-mof'-illy)
- d) anemophily (pron: an-eh-mof'-illy)

ANSWER: B -- ORNITHOPHILY

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TOSS-UP

16. BIOL; Multiple Choice: The smallest of the FORMED elements of the blood are the:

- a) white cells
- b) red cells
- c) platelets
- d) erythrocytes (pron: uh-rith'-eh-sites)

ANSWER: C -- PLATELETS

BONUS

16. BIOL; Multiple Choice: Which of the following statements concerning platelets is INCORRECT. Platelets:

- a) contain DNA
- b) are roughly disk-shaped
- c) have little ability to synthesize proteins
- d) are between 1/2 and 1/3 the diameter of the red cell

ANSWER: A -- CONTAIN DNA

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TOSS-UP

17. ASTR; Short Answer: One of the largest volcanos in our solar system, if not the largest, is named Olympus Mons. Name the planet that has the volcano.

ANSWER: MARS

BONUS

17. ASTR; Multiple Choice: One Jupiter day is equal to which of the following?

- a) 30 hrs 40 min
- b) 9 hrs 50 min
- c) 3 hrs 20 min
- d) 52 hrs 10 min

ANSWER: B -- 9 HRS 50 MIN

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TOSS-UP

18. PHYS; Short Answer: The idea that we CANNOT know both the position and velocity of a subatomic particle at the same time was formulated by:

ANSWER: HEISENBERG

BONUS

18. PHYS; Multiple Choice: A resistor of value  $R/2$  is connected in parallel with a resistor of value  $R/3$ . The voltage drop across the parallel combination is  $V$ . The total current supplied by the voltage source is:

- a)  $2 V/R$  (read: 2 V over R)
- b)  $3 V/R$  (read: 3 V over R)
- c)  $4 V/R$  (read: 4 V over R)
- d)  $5 V/R$  (read: 5 V over R)

ANSWER: D --  $5 V/R$

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### TOSS-UP

19. CHEM; Multiple Choice: Which of the following pairs of German scientists discovered the atomic fission of uranium and set the stage for the nuclear age?

- a) Hahn and Strassman
- b) Nernst and Planck
- c) Ostwald and Heisenberg
- d) Bohr and Einstein

ANSWER: A -- HAHN AND STRASSMAN

### BONUS

19. CHEM; Multiple Choice: Who was the first American chemist to receive a Nobel Prize? He was selected in 1914 for his precise determination of atomic weights.

- a) Edward Frankland
- b) Theodore Richards
- c) John Bardeen
- d) Paul Dirac

ANSWER: B -- THEODORE RICHARDS

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### TOSS-UP

20. ERSC; Short Answer: Biosphere describes the earth realm where life occurs. What describes the entire solid earth realm and is composed of mineral matter?

ANSWER: LITHOSPHERE

### BONUS

20. ERSC; Short Answer: What is the specific term used by geologists to describe rock weathering in which shells or plates are broken away from a rock leaving it flaked in appearance?

ANSWER: EXFOLIATION

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TOSS-UP

21. COMP; Multiple Choice: What FORTRAN symbol represents a BLANK field?

- a) X
- b) I
- c) E
- d) F

ANSWER: A -- X

BONUS

21. COMP; Short Answer: In a FORTRAN program, I (pron: eye) is an integer. What is the value of I after the following FORTRAN statements are executed?

I = 1 (read: eye equals 1)  
I = 2.5 \* I (read: eye equals 2.5 star eye)  
I = I + 1 (read: eye equals eye plus 1)

ANSWER: 3

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TOSS-UP

22. BIOL; Multiple Choice: When a wound occurs in humans, the platelets in the blood activate what substance which starts the clotting process?

- a) adenosine (pron: ah-den'-ah-seen)
- b) histamine
- c) lecithin (pron: less'-ah-thin)
- d) thrombin

ANSWER: D -- THROMBIN

BONUS

22. BIOL; Multiple Choice: When looking at the cross section of the human tibia, one finds the RED marrow in the:

- a) medullary cavity (pron: MED-oo-lare-y)
- b) cancellous bone (pron: kan-SELL-us)
- c) periosteum (pron: per-e-ahs'-tee-em)
- d) epiphysis (pron: eh-pif'-eh-sis)

ANSWER: A -- MEDULLARY CAVITY

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TOSS-UP

23. MATH; Short Answer: What is the value of 125 to the two-thirds power?

ANSWER: 25

BONUS

23. MATH; Short Answer: Twelve socks are in a drawer; 4 are red, 7 are blue, and 1 is green. What is the maximum number of socks that you can pull out and only have 2 matching pairs?

ANSWER: 7

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TOSS-UP

24. CHEM; Multiple Choice: Which of the following terms refers to the number of molecules or ions attached to a central metallic atom?

- a) coordination number
- b) connection number
- c) bonding number
- d) none of these

ANSWER: A -- COORDINATION NUMBER

BONUS

24. CHEM; Multiple Choice: Which of the following terms refers to a material that slows the speed of neutrons?

- a) retarder
- b) moderator
- c) buffer
- d) bottleneck

ANSWER: B -- MODERATOR

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### TOSS-UP

25. PHYS; Multiple Choice: To create an enlarged real image using a concave mirror, the object must be placed:

- a) beyond the center of curvature.
- b) at the focus.
- c) closer than the focus.
- d) between the center of curvature and the focus.

ANSWER: B -- BETWEEN THE CENTER OF CURVATURE AND THE FOCUS.

### BONUS

25. PHYS; Multiple Choice: A car traveling at a constant velocity of 20 meters per second passes a second car that is initially at rest. The car that was at rest starts accelerating at 10 meters per second squared the instant it is passed by the first car. They will meet again in:

- a) 2 seconds
- b) 4 seconds
- c) 6 seconds
- d) 8 seconds

ANSWER: B -- 4 SECONDS

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